

Name: Solutions

Directions: Be careful to give factors when the question says "Factor" and give zeros or solutions when the question says "Solve".

1. Factor $5x^2 + 29x - 6$

$$(5x - 1)(x + 6)$$

2. Solve $4x^2 - 25 = 0$

$$(2x - 5)(2x + 5) = 0$$

$$\left\{\frac{5}{2}, -\frac{5}{2}\right\}$$

$$2x - 5 = 0 \quad 2x + 5 = 0$$

$$2x = 5 \quad 2x = -5$$

$$x = \frac{5}{2}$$

$$x = -\frac{5}{2}$$

3. Factor $n^2 + 10n + 25$

$$(n + 5)(n + 5) = (n + 5)^2$$

4. Solve $x^2 - 6x + 16 = 0$

$$(x - 8)(x + 2) = 0$$

$$\{8, -2\}$$

$$x - 8 = 0 \quad x + 2 = 0$$

$$x = 8$$

$$x = -2$$

5. Factor $y^3 - 27$

$$(y - 3)(y^2 + 3y + 9)$$

6. Solve $7m^2 - 21m = 0$

$$7m(m - 3) = 0$$

$$\{0, 3\}$$

$$7m = 0$$

$$m - 3 = 0$$

$$m = 0$$

$$m = 3$$

7. Factor $2y^3 + 6y^2 - 36y$

$$2y(y^2 + 3y - 18) = 2y(y + 6)(y - 3)$$

8. Solve $x^4 - 5x^2 - 36 = 0$

$$(x^2 - 9)(x^2 + 4) = 0$$

$$(x - 3)(x + 3)(x^2 + 4) = 0$$

$$\{3, -3\}$$

9. Factor $x^3 + 3x^2 - 4x - 12$

$$x^2(x + 3) - 4(x + 3)$$

$$(x + 3)(x^2 - 4)$$

$$(x + 3)(x - 2)(x + 2)$$

10. Solve $x^3 - 3x^2 - 13x + 15 = 0$

$(x - 1)$ is a factor

$$\begin{array}{r|rrrr} 1 & 1 & -3 & -13 & 15 \\ & & 1 & -2 & -15 \\ \hline & 1 & -2 & -15 & 0 = R \\ & & x^2 - 2x - 15 = 0 \end{array}$$

$$(x - 5)(x + 3) = 0$$

$$(x - 1)(x - 5)(x + 3) = 0$$

$$\{1, 5, -3\}$$

11. A polynomial function of degree 3 has the solution set $\{-1, 3, -5\}$. Determine the equation of the function in standard form.

$$(x + 1)(x - 3)(x + 5) = 0$$

$$(x + 1)(x^2 + 2x - 15) = 0$$

$$x^3 + 3x^2 - 13x - 15 = 0$$

12. A polynomial function of degree 3 has the solution set $\left\{0, \frac{-1}{2}, 4\right\}$. Determine the equation of the function in standard form.

$$x = -\frac{1}{2}$$

$$2x = -1$$

$$2x + 1 = 0$$

$$x(2x + 1)(x - 4) = 0$$

$$x(2x^2 - 7x - 4) = 0$$

$$2x^3 - 7x^2 - 4x = 0$$

13. A polynomial function of degree 3 has the solution set $\{-3, 2\}$ where 2 is a double root. Determine the equation of the function in standard form.

$$(x + 3)(x - 2)(x - 2) = 0$$

$$(x + 3)(x^2 - 4x + 4) = 0$$

$$x^3 - x^2 - 8x + 12 = 0$$